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Translation of the pertinent portions of a Notification Regarding the Forwarding of the International Preliminary Report as to Patentability, mailed 03/27/2006

2. This REPORT comprises a total of 7 pages, including the cover page.

3. Furthermore, ATTACHMENTS have also been added to this report, these are

x pages containing the specification, claims and/or drawings which were amended and are the basis of this report, and/or pages with corrections prepared by this Office (see Rule 70.16 and Section 607 of the Administrative Guidelines for PCT).

4. This report contains information regarding the following items:

- I Basis of the Report
- V Reasoned Determination under Article 35.2

I Basis of the Report

1. Regarding the **language**, the report is based on the international application in the language in which it was filed, provided nothing different is noted under this item.

2. Regarding the **COMPONENTS** of the international application, this report is based on:

Specification, pages

2,3,5-22 in the originally filed version,
1, 4, 4a received 10/26/05 with letter of 10/13/05

Claims Nos.

1 to 17 received 10/26/05 with letter of 10/13/05

Drawings, sheets

1/7 to 7/7 in the originally filed version.

V Reasoned Determination under Article 35(2)

1. Determination

Novelty Yes: Claims 1 to 17
 No: Claims

Inventive Activities Yes: Claims 1 to 17
 No: Claims

Commercial Applicability Yes: Claims 1 to 17
 No: Claims

2. References and Explanations

see the attached page

Attached page

Re.: Item V

1. Reference is made to the following documents:

D1: EP-A-1 211 212
D2: DE 198 02 995 A1

2. **Independent claim 1**

2.1 Document D2 is considered to be the closest prior art in regard to the subject of claim 1. It discloses ((the references in parentheses relate to this document):

a system with alternative processing tracks (O, U) for further processing of products (10) in longitudinal folding apparatuses (1, 2), wherein a former (17), as well as a transverse folding apparatus (9, 12) are arranged upstream of the longitudinal folding apparatuses (1, 2) on the product path, and having a shunt (5), at which a conveying track is split into a plurality of alternative transport tracks (O, U) for further processing of the products (10) in the longitudinal folding apparatuses (1, 2), wherein a sensor (19) which detects the product phase relation is arranged upstream of the shunt (5), whose signal acts via a control device (24) on a drive mechanism actuating the shunt (5), and wherein a further sensor (22, 23) is respectively arranged on the at least two transport tracks (O, U).

2.2 The subject of claim 1 therefore differs from the known system in that [i] the further sensor (18) is embodied as a sensor (18) which detects the product phase relation for detecting a passage time, and that the sensor (18) is connected via a control device (10, 19) with a drive mechanism (05) of a folding blade (03) of the longitudinal folding apparatus (01) which is mechanically independent from the drive mechanism of the transport tracks (33, 36, 37), [ii] and which controls the drive mechanism (05) of the folding blade (03) while taking the detected product phase relationship into consideration.

The subject of claim 1 is therefore novel.

2.3 The object to be attained by means of the present invention can be seen in providing an alternative control of the folding blade drive mechanism in a folding apparatus.

For the following reasons, the attainment of this object proposed in claim 1 of the present application is based on inventive activities (Article 33(3) PCT):

Document D1 discloses a control device having the characteristics [i] of the characterizing portion of claim 1. However, the folding blade in this document is controlled by taking the detected speed of the products into consideration. The proposed attainment is therefore neither known from the prior art, nor is it suggested by it.

2.4 Claims 3 to 9, 12 to 14 depend from claim 1 and therefore also meet the requirements of PCT in regard to novelty and inventive activities.

3. Independent claim 2

3.1 Document D1 is considered to be the closest prior art in respect to the subject of claim 1 [sic]. It discloses (the references in parentheses relate to this document) :

a longitudinal folding apparatus, to which a product (12) can be supplied over a transport track (10), wherein a sensor (14) is arranged on the transport track (10) upstream of the longitudinal folding apparatus, wherein the sensor (14) is embodied as a sensor (14) which detects the product phase relation for detecting a passage time, and the sensor (14) is connected via a control device (18) with a drive mechanism (30), which is mechanically independent from the drive mechanism of the transport tracks (10), of a folding blade of the longitudinal folding apparatus, and that the drive mechanism is embodied as a motor, which lowers or raises the folding blade in relation to the folding table by means of a gear.

3.2 Therefore the subject of claim 2 differs from the known folding apparatus in that the drive mechanism is controlled while taking into consideration the detected product phase relationship, i.e. clocked in respect to the position of the product.

Therefore the subject of claim 2 is novel (Article 33(2) PCT).

3.3 The object to be attained by means of the present invention can therefore be seen to be the creation of an alternative control of the folding blade drive mechanism in a folding apparatus.

For the following reasons the attainment of the object proposed in claim 2 of the present application is based on inventive activities (Article 33(3) PCT):

above paragraph 2.3 applies mutatis mutandis.

3.4 Claims 3 to 14 depend from claim 2 and therefore also meet the requirements of PCT in regard to novelty and inventive activities.

4. Independent claim 15

4.1 Document D2 is considered to be the closest prior art in respect to the subject of claim 15. It discloses (the references in parentheses relate to this document):

a method for the synchronous operation of a folding apparatus with alternative processing paths, wherein

- a product phase relationship is determined by means of a sensor (19) arranged upstream of a shunt (5),
- by means of standards fixed for the production, the product flow is conducted by means of the shunt (5) into a predetermined processing path or is split into several processing paths,
- in that an operating position of the shunt (5) is synchronized with the product phase relationship on the basis of the signals from the sensor (19).

4.2 The subject of claim 15 therefore differs from the known method in that [i] a product phase relationship, i.e. a passage time, is determined prior to or at the time of entry into the processing stage by means of a second sensor (18), which is arranged downstream of the shunt (34) and upstream of a processing stage, and [ii] the movement of a folding blade of the processing stage for a raising or lowering movement relative to the folding table for processing the product is synchronized with the product phase relationship by means of the signals from the second sensor (18) by a second control device (10).

Therefore the subject of claim 15 is novel (Article 33(2) PCT).

4.3 The object to be attained by means of the present invention can therefore be seen to lie in creating an alternative control of the folding blade drive mechanism in a folding apparatus.

For the following reasons the attainment of this object proposed in claim 15 of the present application is based on inventive activities (Article 33(3) PCT):

above paragraph 2.3 applies mutatis mutandis.

4.4 Claims 16, 17 depend from claim 15 and therefore also meet the requirements of PCT in regard to novelty and inventive activities.

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Specification

System Comprising Alternative Processing Sections for the Further Processing of Products, Longitudinal Folding Device and Method for the Synchronous Operation of a Folding Device

The invention relates to a system with alternative processing sections for the further processing of products, a longitudinal folding apparatus, as well as a method for the synchronous operation of a folding apparatus in accordance with the preambles of claims 1, 2 or 15.

In folding apparatuses, in particular for products of a rotary printing press, product sections are further processed in several successive and partially alternatively selectable processing stages. The alternative assignment of product sections to several processing stages takes place by means of a product shunt. In conventional folding apparatuses, the product shunt, as well as the tools of the subsequent processing stages, are mostly driven via gears from a main drive mechanism of the folding apparatus or its transport devices and are synchronized with them. However, if prior to their entry into the shunt and/or prior to their entry in the downstream located processing stage, the product sections are not always exactly oriented, damage to the products, a reduction in quality and/or even the stoppage of the installation can occur either in the course of the passage through the shunt or during subsequent further processing.

A product shunt of a folding apparatus with two downstream located longitudinal folding apparatuses is disclosed in DE 198 02 995 C2, wherein a sensor for detecting the phase relation of the

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product is located upstream of the product shunt, and a sensor is located downstream of each of the two succeeding product sections for detecting jams in these sections. The three sensors, one sensor detecting the number of revolutions of the main drive mechanism, as well as a switching device setting a production type, are connected with a regulating arrangement for controlling

Premature folding can also occur if printed products enter the longitudinal folding apparatus delayed and driving of the folding blade (tool of the processing change) is provided by a main drive mechanism.

EP 1 211 212 A2 shows a folding blade control device of a longitudinal folding apparatus with a sensor arranged upstream of the longitudinal folding apparatus, wherein a control of the triggering time is determined as a function of the speed of the transported product sections determined by means of the sensor.

DE 198 28 625 A1 relates to a transverse folding device for the transverse folding of sheets. It has a folding blade inclined in the transport direction, as well as an automatic control for the position or the correct separation of the sheets and is embodied for being capable of transversely folding sheets of paper once or several times.

The object of the invention is based on increasing the product quality and operational dependability in a system with alternative processing section for the further processing of products and in a longitudinal folding apparatus, as well as on the creation of an appropriate method for the synchronous operation of a folding apparatus.

In accordance with the invention, this object is attained by means of the characteristics of claims 1, 2 or 15.

The advantages which can be obtained by means of the invention consist in particular in that on the one hand the product quality, and on the other hand the operational dependability (availability) of the folding apparatus, are considerably increased. This is advantageously assured by means

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of the optical detection of the position of the products upstream of the two longitudinal folding apparatuses and the synchronization of the folding blade, which is driven mechanically independently from the conveying system and/or a movable buffer and/or an optical detection of the position of the products upstream of the shunt.

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By means of the optical detection of the phase relation of the products directly prior to longitudinal folding it is possible to ideally synchronize the time of folding and to correct it if required. The quality is further improved if in addition movable buffers are also synchronized by means of optical detection and reduce the bumping and assure an exact product alignment.

In an advantageous embodiment a gentle braking of the products, for example printed products, is achieved at the longitudinal folding apparatus by means of the movable buffer, because the kinetic energy with which the products bump against the moving buffer is reduced in comparison with the kinetic energy

Claims

1. A system with alternative processing tracks for further processing of products (02) in longitudinal folding apparatuses (01), wherein a former, as well as a transverse folding apparatus are arranged in the product path upstream of the longitudinal folding apparatuses (01), and having a shunt (34), at which a conveying track (33) is split into a plurality of alternative transport tracks (36, 37) for further processing of the products (02) in the longitudinal folding apparatuses (01), wherein a sensor (39) which detects the product phase relation is arranged upstream of the shunt (34), whose signal acts via a control device (41) on a drive mechanism (42) actuating the shunt (34), and wherein a further sensor (18) is respectively arranged on the at least two transport tracks (36, 37), characterized in that the further sensor (18) is embodied as a sensor (18) which detects the product phase relation for determining a passage time, and that the sensor (18) is connected via a control device (10, 19) with a drive mechanism (05, 16), which is mechanically independent from the drive mechanism of the transport tracks (33, 36, 37), of a folding blade (03) of the longitudinal folding apparatus (01) which can be moved up and down relative to a folding table (04) and which controls the drive mechanism (05) of the folding blade (03) while taking the detected product phase relationship into consideration.

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2. A longitudinal folding apparatus (01), upstream of which longitudinal folding apparatuses (01), as well as a transverse folding apparatus, are arranged, wherein a product (02) can be supplied to the longitudinal folding apparatus (01) over a transport track (36, 37), wherein a sensor (18) is arranged on the transport track (36, 37) upstream of the longitudinal folding apparatus (01), characterized in that the sensor (18) is embodied as a sensor (18) which detects the product phase relation for determining the passage time, and the sensor (18) is connected via a control device (10) with a drive mechanism (05, 16), which is mechanically independent from the drive mechanism of the transport tracks (33, 36, 37), of a folding blade (03) of the longitudinal folding apparatus (01), which controls the drive mechanism (05)

while taking the detected product phase relationship into consideration, and that the drive mechanism (05) is embodied as a motor (05), which lowers or raises the folding blade (03) in relation to a folding table (04) via a gear of the folding blade (03) in a clocked manner.

3. The system in accordance with claim 1 or the longitudinal folding apparatus (01) in accordance with claim 2, characterized in that the blade (04) is seated on at least one lever, which can be pivoted in respect to a folding table (04).

4. The system in accordance with claim 1 or the longitudinal folding apparatus (01) in accordance with claim 2, characterized in that the longitudinal folding apparatus (01) has a movable buffer (13, 14), which slows down a product (02) entering the longitudinal folding apparatus.

5. The system or the longitudinal folding apparatus (01) in accordance with claim 4, characterized in that the buffer (13, 14) can be moved along the braking path (24) of the printed products (02, 22) at a lesser speed than the entry speed (v_0).

6. The system or the longitudinal folding apparatus (01) in accordance with claim 4, characterized in that the drive mechanism (16) which is mechanically independent of the drive mechanism of the transport tracks (33, 36, 37) is embodied as the drive mechanism (16) of the buffer (13, 14).

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7. The system or the longitudinal folding apparatus (01) in accordance with claim 6, characterized in that the drive mechanism (05) of the folding blade (03), as well as the drive mechanism (16) of the buffer (13, 14), are controlled by employing the signal from the sensor (18).

8. The system or the longitudinal folding apparatus (01) in accordance with claim 4, characterized in that the movable

buffer (13, 14) is arranged on an endless belt (12) running on the circumference of a rotatable body (15) which extends at least by a section into the braking path (24).

9. The system or the longitudinal folding apparatus (01) in accordance with claim 4, characterized in that the movable buffer (13, 14) is arranged on a moving endless belt (12) having a section which extends parallel with the braking path (24).

10. The longitudinal folding apparatus (01) in accordance with claim 2, characterized in that a shunt (34) is arranged upstream of the longitudinal folding apparatus (01), by means of which the products (02) can be alternatively supplied to the longitudinal folding apparatus (01) or another processing stage (01).

11. The longitudinal folding apparatus (01) in accordance with claim 10, characterized in that a sensor (39), which detects the product phase relationship, is arranged upstream of the shunt (34), whose signal acts via a control device (41) on a drive mechanism (42) which actuates the shunt (34).

12. The system in accordance with claim 1 or the longitudinal folding apparatus (01) in accordance with claim 11, characterized in that the control device (41) is designed for synchronizing an operating position of the shunt (34) with the detected product phase relationship by employing the signal from

the sensor (39).

13. The system in accordance with claim 1 or the longitudinal folding apparatus (01) in accordance with claim 2, characterized in that the control device (10, 19) is designed for synchronizing the movement of the folding blade (03) with the detected product phase relationship by employing the signal from the sensor (18).

14. The system or the longitudinal folding apparatus (01) in accordance with claim 4, characterized in that the control device (10, 19) is designed for synchronizing the movement of the

buffer (13, 14) with the product phase relationship by employing the signal from the sensor (18).

15. A method for the synchronous operation of a folding apparatus with alternative processing paths, wherein

- a product phase relationship is determined by means of a sensor (39) arranged upstream of a shunt (34),
- by means of standards fixed for the production, the product flow is conducted by means of the shunt (34) into a selected processing path or is split into several processing paths,
- in that an operating position of the shunt (34) is synchronized with the product phase relationship on the basis of the signals from the sensor (39),
- a product phase relationship, i.e. a passage time, is determined prior to or at the time of entry into the processing stage (01) by means of a second sensor (18), which is arranged downstream of the shunt (34) and upstream of a processing stage (01),
- and a drive mechanism (05) for a raising or lowering movement relative to the folding table (04) of a folding blade (03) of the processing stage (01) for processing the product is synchronized with the product phase relationship by means of the signals from a second sensor (18) by a second control device (10).

16. The method in accordance with claim 15, characterized in that the synchronization of the operating position of the shunt

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(34) with the product phase relationship takes place by means of a first control device (42).

17. The method in accordance with claim 15, characterized in that the synchronization of the movement of the folding blade (03) with the product phase relationship takes place by means of a second control device (10).